Appendix H

Noise Impact Analysis

NOISE IMPACT ANALYSIS

BAKER RANCH PROPERTIES

CITY OF LAKE FOREST, CALIFORNIA

LSA

November 2013

NOISE IMPACT ANALYSIS

BAKER RANCH PROPERTIES

CITY OF LAKE FOREST, CALIFORNIA

Submitted to:

Baker Ranch Properties LLC
One Upper Newport Plaza Drive
Newport Beach, California 92660

Prepared by:

LSA Associates, Inc.
20 Executive Park, Suite 200
Irvine, California 92614-4731
(949) 553-0666

LSA Project No. BRP1301

LSA

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BAKER RANCH PROPERTIES

1.0 INTRODUCTION

This noise impact analysis has been prepared to evaluate the potential noise impacts and mitigation measures associated with the Baker Ranch Properties residential development (proposed project) in the City of Lake Forest (City), California. This report is intended to satisfy the City's requirement for a project-specific noise impact analysis and examines the impacts of the proposed noise-sensitive uses on the project site together with the project design features and standard conditions. Since the area that includes the proposed project was within the area analyzed in the City's certified Program Environmental Impact Report for the Opportunity Study Area (PEIR), certain mitigation measures from the PEIR will be implemented by the proposed project. Modeled noise levels are based upon vehicle data included in a traffic study prepared for the proposed project (RBF Consulting [RBF], October 2013).

1.1 Project Description

The proposed project site is 30.036 acres and is bounded by State Route 241 (SR-241) to the north, Rancho Parkway to the south, Portola Parkway to the east, and existing commercial/industrial uses to the west. The project location is illustrated in Figure 1, and the project conceptual plan is illustrated in Figure 2. The Baker Ranch Properties land uses include up to 250 single-family dwelling units (DU), a swimming pool/recreational area, and a water quality control basin.

1.2 Approaches Used in the Noise Impact Assessment

Evaluation of noise impacts associated with the proposed project includes the following:

- Determine the short-term construction noise impacts on off-site sensitive receptors,
- Determine the long-term off-site mobile- and stationary-source noise impacts on on-site noise-sensitive receptors, and
- Evaluate the prior-adopted standard conditions, mitigation measures together with any project design features and determine if additional mitigation measures are required to reduce short-term and long-term on-site and off-site noise impacts.

1.3 Characteristics of Sound

Sound is increasing to such disagreeable levels in our environment that it can threaten our quality of life. Noise is usually defined as unwanted sound. Noise consists of any sound that may produce physiological or psychological damage and/or interfere with communication, work, rest, recreation, and sleep. To the human ear, sound has two significant characteristics: pitch and loudness. Pitch is generally an annoyance, while loudness can affect our ability to hear. Pitch is the number of complete

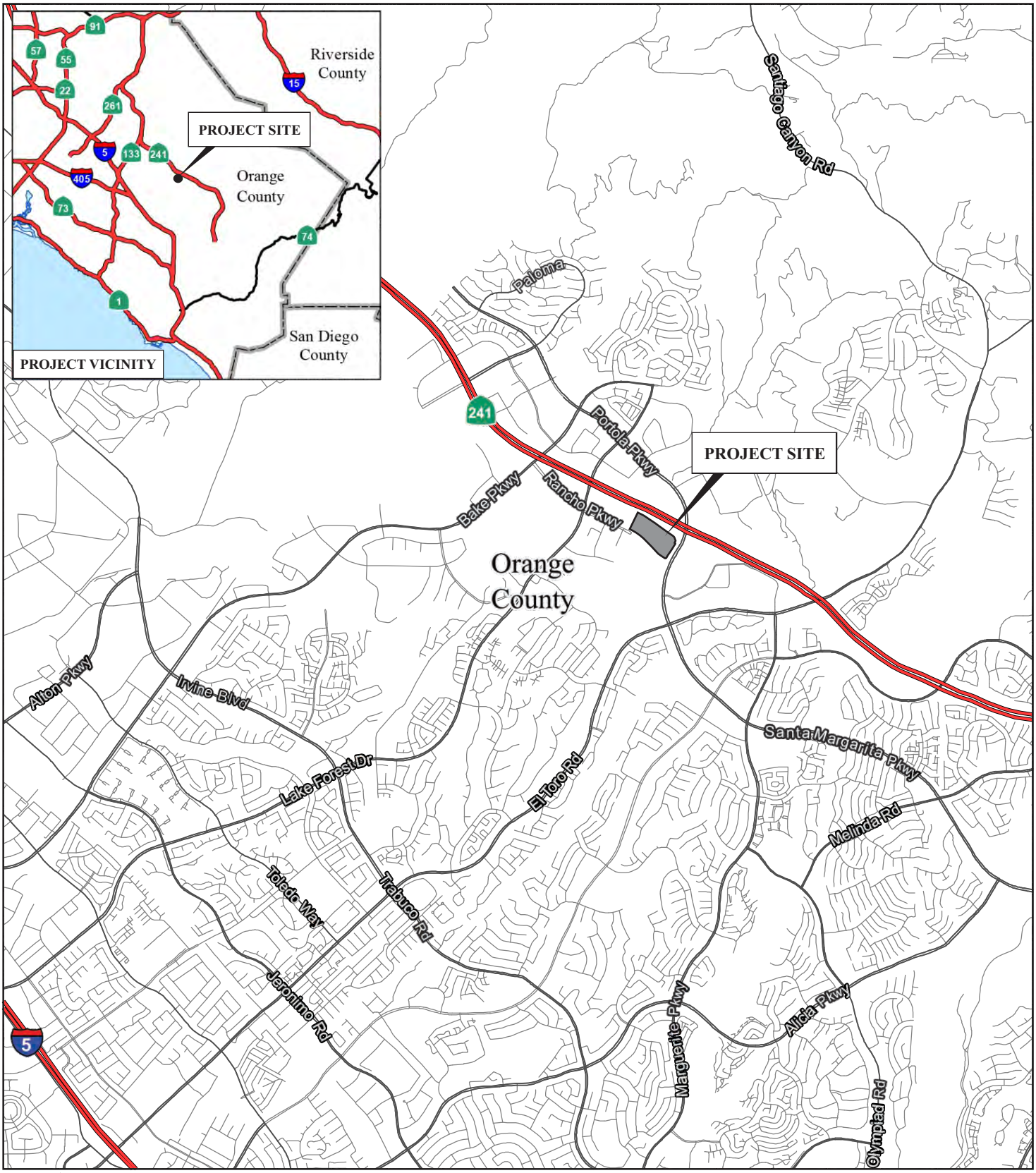

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FIGURE 1

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SOURCE: Bing Maps (c. 2008); ESRI (2008

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Baker Ranch Properties

Project Location Map

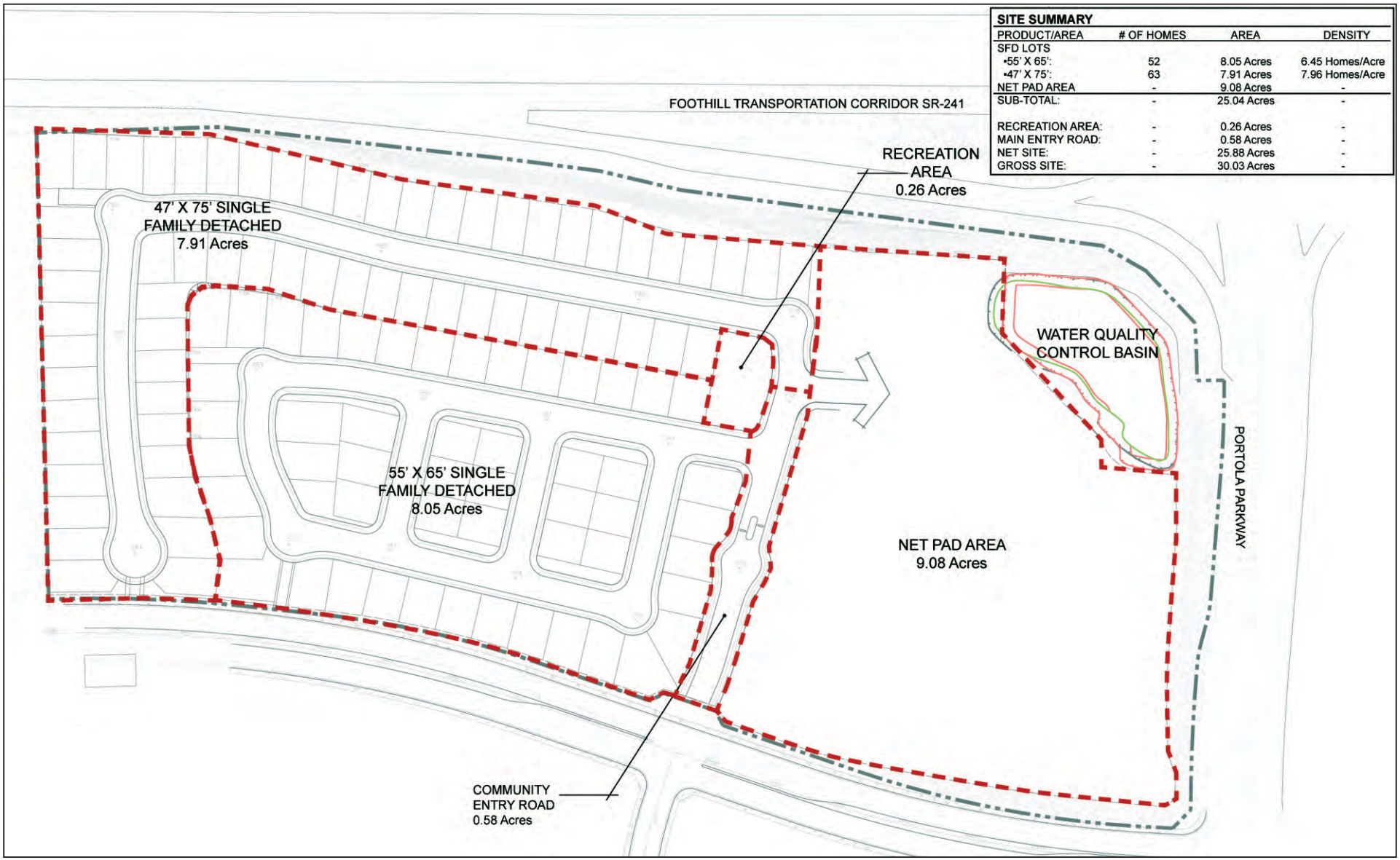

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FIGURE 2

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SOURCE: Bassenian/Lagoni Architecture Planning Interiors

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Baker Ranch Properties

Site Plan

vibrations, or cycles per second, of a wave resulting in the tone's range from high to low. Loudness is the strength of a sound that describes a noisy or quiet environment and is measured by the amplitude of the sound wave. Loudness is determined by the intensity of the sound waves, combined with the reception characteristics of the human ear. Sound intensity refers to how hard the sound wave strikes an object, which in turn produces the sound's effect. This characteristic of sound can be precisely measured with instruments. The analysis of a project defines the noise environment of the project area in terms of sound intensity and its effect on adjacent sensitive land uses.

1.4 Measurement of Sound

Sound intensity is measured through the A-weighted scale to correct for the relative frequency response of the human ear. That is, an A-weighted noise level de-emphasizes low and very high frequencies of sound similar to the human ear's de-emphasis of these frequencies. Unlike linear units, such as inches or pounds, decibels (dB) are measured on a logarithmic scale representing points on a sharply rising curve.

For example, 10 dB are 10 times more intense than 1 dB, 20 dB are 100 times more intense, and 30 dB are 1,000 times more intense. Thirty dB represent 1,000 times as much acoustic energy as 1 dB. The dB scale increases as the square of the change, representing the sound pressure energy. A sound as soft as human breathing is about 10 times greater than 0 dB. The dB system of measuring sound gives a rough connection between the physical intensity of sound and its perceived loudness to the human ear. A 10 dB increase in sound level is perceived by the human ear as only a doubling of the loudness of the sound. Ambient sounds generally range from 30 A-weighted decibels (dBA) (very quiet) to 100 dBA (very loud).

Sound levels are generated from a source, and their dB level decreases as the distance from that source increases. Sound dissipates exponentially with distance from the noise source. For a single point source, sound levels decrease approximately 6 dBA for each doubling of distance from the source. This drop-off rate is appropriate for noise generated by stationary equipment. If noise is produced by a line source, such as highway traffic or railroad operations, the sound decreases 3 dBA for each doubling of distance in a hard site environment. Line source, noise in a relatively flat environment with absorptive vegetation, decreases 4.5 dBA for each doubling of distance.

There are many ways to rate noise for various time periods, but an appropriate rating of ambient noise affecting humans also accounts for the annoying effects of sound. Equivalent continuous sound level (L_{eq}) is the total sound energy of time varying noise over a sample period. However, the predominant rating scales for human communities in the State of California are the L_{eq} and community noise equivalent level (CNEL) or the day-night average level (L_{dn}) based on dBA. CNEL is the time varying noise over a 24-hour period, with a 5 dBA weighting factor applied to the hourly L_{eq} for noises occurring from 7:00 p.m. to 10:00 p.m. (defined as relaxation hours) and a 10 dBA weighting factor applied to noise occurring from 10:00 p.m. to 7:00 a.m. (defined as sleeping hours). L_{dn} is similar to the CNEL scale, but without the adjustment for events occurring during the evening hours. CNEL and L_{dn} are within 1 dBA of each other and are normally exchangeable. The City of Lake Forest uses the CNEL noise scale for long-term noise impact assessment.

Other noise rating scales of importance when assessing the annoyance factor include the maximum instantaneous noise level (L_{max}), which is the highest exponential time averaged sound level that occurs during a stated time period. The noise environments discussed in this analysis for short-term noise impacts are specified in terms of maximum levels denoted by L_{max}, which reflects peak operating conditions and addresses the annoying aspects of intermittent noise. It is often used together with another noise scale, or noise standards in terms of percentile noise levels, in noise ordinances for enforcement purposes. For example, the L_{10} noise level represents the noise level exceeded 10 percent of the time during a stated period. The L_{50} noise level represents the median noise level. One-half the time the noise level exceeds this level, and one-half the time it is less than this level. The L_{90} noise level represents the noise level exceeded 90 percent of the time and is considered the background noise level during a monitoring period. For a relatively constant noise source, the L_{eq} and L_{50} are approximately the same.

Noise impacts can be described in three categories. The first is audible impacts that refer to increases in noise levels noticeable to humans. Audible increases in noise levels generally refer to a change of 3.0 dB or greater since this level has been found to be barely perceptible in exterior environments. The second category, potentially audible, refers to a change in the noise level between 1.0 and 3.0 dB. This range of noise levels has been found to be noticeable only in laboratory environments. The last category is changes in noise level of less than 1.0 dB, which are inaudible to the human ear. Only audible changes in existing ambient or background noise levels are considered potentially significant.

1.5 Physiological Effects of Noise

Physical damage to human hearing begins at prolonged exposure to noise levels higher than 85 dBA. Exposure to high noise levels affects our entire system, with prolonged noise exposure in excess of 75 dBA increasing body tensions, thereby affecting blood pressure and functions of the heart and the nervous system. In comparison, extended periods of noise exposure above 90 dBA would result in permanent cell damage. When the noise level reaches 120 dB, a tickling sensation occurs in the human ear even with short-term exposure. This level of noise is called the threshold of feeling. As the sound reaches 140 dB, the tickling sensation is replaced by the feeling of pain in the ear. This is called the threshold of pain. A sound level of 160 to 165 dB will result in dizziness or loss of equilibrium. The ambient or background noise problem is widespread and generally more concentrated in urban areas than in outlying less developed areas.

Table A lists “Definitions of Acoustical Terms,” and Table B shows “Common Sound Levels and Their Noise Sources.”

Table A: Definitions of Acoustical Terms

Term	Definitions
Decibel, dB	A unit of level that denotes the ratio between two quantities proportional to power; the number of decibels is 10 times the logarithm (to the base 10) of this ratio.
Frequency, Hz	Of a function periodic in time, the number of times that the quantity repeats itself in one second (i.e., number of cycles per second).
A-Weighted Sound Level, dBA	The sound level obtained by use of A-weighting. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise. All sound levels in this report are A-weighted, unless reported otherwise.
L_{01}, L_{10}, L_{50}, L_{90}	The fast A-weighted noise levels equaled or exceeded by a fluctuating sound level for 1 percent, 10 percent, 50 percent, and 90 percent of a stated time period.
Equivalent Continuous Noise Level, L_{eq}	The level of a steady sound that, in a stated time period and at a stated location, has the same A-weighted sound energy as the time varying sound.
Community Noise Equivalent Level, CNEL	The 24-hour A-weighted average sound level from midnight to midnight, obtained after the addition of five decibels to sound levels occurring in the evening from 7:00 p.m. to 10:00 p.m. and after the addition of 10 decibels to sound levels occurring in the night between 10:00 p.m. and 7:00 a.m.
Day/Night Noise Level, L_{dn}	The 24-hour A-weighted average sound level from midnight to midnight, obtained after the addition of 10 decibels to sound levels occurring in the night between 10:00 p.m. and 7:00 a.m.
L_{max}, L_{min}	The maximum and minimum A-weighted sound levels measured on a sound level meter, during a designated time interval, using fast time averaging.
Ambient Noise Level	The all-encompassing noise associated with a given environment at a specified time, usually a composite of sound from many sources at many directions, near and far; no particular sound is dominant.
Intrusive	The noise that intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends upon its amplitude, duration, frequency, and time of occurrence and tonal or informational content, as well as the prevailing ambient noise level.

Source: Handbook of Acoustical Measurements and Noise Control (1991).

Table B: Common Sound Levels and Their Noise Sources

Noise Source	A-Weighted Sound Level in Decibels	Noise Environments	Subjective Evaluations
Near Jet Engine	140	Deafening	128 times as loud
Civil Defense Siren	130	Threshold of Pain	64 times as loud
Hard Rock Band	120	Threshold of Feeling	32 times as loud
Accelerating Motorcycle at a few feet away	110	Very Loud	16 times as loud
Pile Driver; Noisy Urban Street/Heavy City Traffic	100	Very Loud	8 times as loud
Ambulance Siren; Food Blender	95	Very Loud	
Garbage Disposal	90	Very Loud	4 times as loud
Freight Cars; Living Room Music	85	Loud	
Pneumatic Drill; Vacuum Cleaner	80	Loud	2 times as loud
Busy Restaurant	75	Moderately Loud	
Near Freeway Auto Traffic	70	Moderately Loud	Reference Level
Average Office	60	Quiet	½ as loud
Suburban Street	55	Quiet	
Light Traffic; Soft Radio Music in Apartment	50	Quiet	¼ as loud
Large Transformer	45	Quiet	
Average Residence Without Stereo Playing	40	Faint	⅛ as loud
Soft Whisper	30	Faint	
Rustling Leaves	20	Very Faint	
Human Breathing	10	Very Faint	Threshold of Hearing
	0	Very Faint	

Source: Compiled by LSA Associates, Inc. (2003).

2.0 EXISTING CONDITIONS

2.1 Sensitive Land Uses in the Project Vicinity

There are no existing residential uses immediately adjacent to the project site. There are existing commercial and light industrial uses immediately to the west, the Saddleback Church property to the east, and Lake Forest Sports Park (Sports Park) to the south of the project site. The closest existing residential uses are located at least 1,500 feet (ft) to the south or southeast of the project site along El Toro Road.

2.2 Overview of the Existing Noise Environment

The primary existing noise sources in the project area are commercial/industrial uses and transportation facilities. Traffic on State Route 241 (SR 241), Portola Parkway, Rancho Parkway, and other local streets is the main source contributing to the background noise. Vehicles and operations associated with adjacent commercial/warehouse uses also contribute to the ambient noise in the project vicinity. Occasional aircraft overflight generates noise higher than the other more steady background noise sources. However, the project site is not in a flight pattern area (i.e., take off or landing for any airports) and therefore aircraft noise is basically from private planes or high altitude overflight. Other contributing sources include intermittent noise associated with commercial uses to the west of the project site. The ambient noise survey conducted by LSA showed that noise in the project vicinity ranged from 55 to 64 dBA with the most significant contributor being traffic noise.

The Federal Highway Administration (FHWA) highway traffic noise prediction model (FHWA RD-77-108) was used to evaluate highway traffic-related noise conditions along the roadway segments in the project vicinity. Existing traffic volumes in the project's traffic study (RBF Consulting, October 2013) were used to assess the existing traffic noise impacts. A typical vehicle mix for Southern California was used. Table C provides the traffic noise levels along the roadways adjacent to the project site under the existing conditions. These noise levels represent the worst-case scenario, which assumes that no shielding is provided between the traffic and the location where the noise contours are drawn. The specific assumptions used in developing these noise levels and model printouts are provided in Appendix A.

Table C shows that, under existing conditions, traffic noise levels along roadway segments in the project vicinity are moderate to high, with the 70 dBA CNEL confined within the roadway right-of-way along Rancho Parkway. The 65 and 60 dBA CNEL contours extend to 81 ft and 167 ft, respectively, from the centerline of Rancho Parkway. Along Portola Parkway, the 70, 65, and 60 dBA CNEL contours extend to 66 ft, 136 ft, and 288 ft, respectively, from the roadway centerline. SR-241 would have its 70, 65, and 60 dBA CNEL contours extending to 190 ft, 403 ft, and 866 ft, respectively, from the centerline of the toll road.

2.3 Applicable City Noise Standards

A project will normally have a significant effect on the environment related to noise if it will substantially increase the ambient noise levels for adjoining areas or conflict with adopted environmental plans and goals of the community in which it is located. The applicable noise standards governing the project site are the City's noise criteria.

Table C: Existing Traffic Noise Levels

Roadway Segment	ADT	Centerline to 70 CNEL (ft)	Centerline to 65 CNEL (ft)	Centerline to 60 CNEL (ft)	CNEL (dBA) 50 ft from Centerline of Outermost Lane
Rancho Pkwy. west of Lake Forest Dr.	8,300	< 50	82	170	65.7
Rancho Pkwy. between Lake Forest Dr. and Sports Park	8,900	< 50	85	178	66.0
Rancho Parkway between Sports Park and Portola Pkwy.	8,100	< 50	81	167	65.6
Lake Forest Dr. north of Rancho Pkwy.	16,000	61	123	262	68.6
Lake Forest Dr. south of Rancho Pkwy.	18,500	66	136	288	69.2
Portola Pkwy. north of Rancho Pkwy.	23,900	77	160	342	70.3
Portola Pkwy. south of Rancho Pkwy.	30,600	90	188	403	71.4
SR-241 toll road	39,900	190	403	866	75.7

Source: LSA Associates, Inc. (October 2013).
Notes: Traffic noise within 50 ft of the roadway centerline should be evaluated with site-specific information. Modeled using the "Soft" setting and the Orange County default fleet percentages on Rancho Parkway, and Caltrans data for the SR-241 toll road.
ADT = average daily traffic
Caltrans = California Department of Transportation
CNEL = Community Noise Equivalent Level
dBA = A-weighted decibels
ft = foot/feet
SR-241 = State Route 241

Noise Element of the General Plan. Applicable policies and standards governing environmental noise in the City of Lake Forest are set forth in the Noise Element of the General Plan. The Noise Element was compiled under the mandate of Section 653021(g) of the California Government Code and guidelines prepared by the California Department of Health Services (DHS). The Noise Element quantifies the community noise environment in terms of noise exposure contours for both near- and long-term levels of growth and traffic activity.

Table D lists State compatibility guidelines for various land uses. For example, a residential use is acceptable in areas with up to 60 dBA CNEL. Residential uses in a 60-70 dBA CNEL zone would be appropriate only with certain mitigation. For commercial or business office buildings, noise levels up to 70 dBA CNEL are conditionally acceptable with noise insulation. In areas with noise levels from 70 to 75 dBA CNEL, construction of commercial/business office buildings would require acoustic analysis to determine the insulation needed.

Table E presents the City of Lake Forest's interior and exterior noise standards for assessing the compatibility of land uses with the noise environment. This matrix may be used to determine whether a certain type of land use is appropriate in a particular CNEL zone. The City requires that all outdoor living areas associated with new residential uses be attenuated to less than 65 dBA CNEL. All new residential units and noise-sensitive land uses shall have an interior noise level in living areas no greater than 45 dBA CNEL.

The City also enforces building sound transmission loss and indoor fresh-air ventilation requirements specified in Chapter 35 of the Uniform Building Code.

Table D: Noise/Land Use Compatibility Matrix

Land Use Category	50 dBA	55 dBA	60 dBA	65 dBA	70 dBA	75 dBA	80 dBA
Residential – Single-Family, Multifamily, Duplex	A	A	B	B	C	C	D
Residential – Mobile Homes	A	A	A	B	C	C	D
Transient Lodging – Motels, Hotels	A	A	A	B	B	C	D
Schools, Libraries, Churches, Hospitals, Nursing/Convalescent Homes, Preschools, Day Care Centers	A	A	A	B	C	C	D
Auditoriums, Concert Halls, Amphitheaters, Meeting Halls	B	B	B	C	D	D	D
Sports Areas, Outdoor Spectator Sports, Amusement Parks	A	A	A	A	B	B	D
Playgrounds, Neighborhood Parks	A	A	A	A	B	C	D
Golf Courses, Riding Stables, Cemeteries	A	A	A	A	A	B	C
Office and Professional Buildings	A	A	A	A	B	B	C
Commercial Retail, Banks, Restaurants, Theaters	A	A	A	A	A	B	B
Industrial, Manufacturing, Utilities, Wholesale, Service Stations	A	A	A	A	A	B	B
Agriculture	A	A	A	A	A	A	A

Source: City of Lake Forest General Plan, Safety and Noise Element (June 21, 1994).
KEY:

Zone A. Normally Acceptable—Specified land use is satisfactory, based on the assumption that any buildings involved are of normal conventional construction without any special noise insulation requirements.

Zone B. Conditionally Acceptable—New construction or development should be undertaken only after detailed analysis of noise reduction requirement is made and needed noise insulation features in the design are determined. Conventional construction, with closed windows and fresh air supply systems or air-conditioning, will normally suffice.

Zone C. Normally Unacceptable—New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of noise reduction requirements must be made and needed noise insulation features included in the design.

Zone D. Clearly Unacceptable—New construction should generally not be undertaken.

dBA = A-weighted decibels

Table E: Interior and Exterior Noise Standards

Land Use	Noise Standards	
	Interior[1]	Exterior
Residential: Single-Family, Multifamily, Duplex, Mobile Home	45 dBA CNEL	65 dBA CNEL[2]
Residential: Transient Lodging, Hotels, Motels, Nursing Homes, Hospitals	45 dBA CNEL	65 dBA CNEL
Private Offices, Church Sanctuaries, Libraries, Board Rooms, Conference Rooms, Theaters, Auditoriums, Concert Halls, Meeting Halls, etc.	45 dBA $L_{eq}(12)$[3]	—
Schools	45 dBA $L_{eq}(12)$	67 dBA $L_{eq}(12)$[4]
General Offices, Reception, Clerical, etc.	50 dBA $L_{eq}(12)$	—
Bank Lobby, Retail Store, Restaurant, Typing Pool, etc.	55 dBA $L_{eq}(12)$	—
Manufacturing, Kitchen, Warehousing, etc.	65 dBA $L_{eq}(12)$	—
Park, Playgrounds	—	65 dBA CNEL
Golf Courses, Outdoor Spectator Sports, Amusement Parks	—	70 dBA CNEL

Source: City of Lake Forest (July 11, 1995).

1 Noise standard with windows closed. Mechanical ventilation shall be provided per Uniform Building Code requirements to provide a habitable environment. Indoor environment excludes bathrooms, toilets, closets, and corridors.

2 Outdoor environment limited to rear yard of single-family homes, multifamily patios and balconies (with a depth of 6 ft or more), and common recreation areas.

3 Religious institutions (churches, temples, and other places of worship) of a small size (occupancy of 100 persons or less) may occupy existing buildings within areas of exterior noise levels. ranging from 65 to 75 dBA CNEL without providing additional noise insulation for the building.

4 Outdoor environment limited to playground areas, picnic areas, and other areas of frequent human use.

CNEL = Community Noise Equivalent Level
dBA = A-weighted decibels
$L_{eq}(12)$ = the A-weighted equivalent sound level averaged over a 12-hour period (usually the hours of operation).

Noise Control Ordinance. The City's Municipal Code, Chapter 11.16, Noise Control, specifies that noise resulting from construction activities are generally exempted from provisions of the Noise Ordinance except for the periods of time between 8:00 p.m. and 7:00 a.m. the following day from Monday through Saturday, and on Sundays and federal holidays. Construction noise during the allowed construction time periods is exempt from the noise level provisions in the Noise Control Ordinance.

The Noise Control Ordinance identifies that maximum permissible exterior ambient noise level for residential uses shall be no greater than 55 dBA between 7:00 a.m. and 10:00 p.m. and no greater than 50 dBA between 10:00 p.m. and 7:00 a.m. Maximum permissible interior ambient noise level for residential uses shall be no greater than 55 dBA between 7:00 a.m. and 10:00 p.m. and no greater than 45 dBA between 10:00 p.m. and 7:00 a.m.

The permitted exterior ambient noise level shall not be exceeded for more than 30 minutes in any hour. The exterior ambient noise level plus 5 dBA shall not be exceeded for a cumulative period of more than 15 minutes in any hour; or the exterior ambient noise level plus 10 dBA shall not be exceeded for a cumulative period of more than 5 minutes in any hour; or the exterior ambient noise level plus 15 dBA shall not be exceeded for more than 1 minute in any hour; or the exterior ambient noise level plus 20 dBA shall not be exceeded for any period of time (i.e., 75 and 70 dBA L_{max} during

daytime and nighttime, respectively). If the ambient noise level exceeds any of the first four noise limit categories above, the cumulative period applicable to such category shall be increased to reflect such ambient noise level. If the ambient noise level exceeds the fifth noise limit category, the maximum allowable noise level under such category shall be increased to reflect the maximum ambient noise level.

The permitted interior ambient noise level shall not be exceeded for more than five minutes in any hour; or the interior ambient noise level plus 5 dBA shall not be exceeded for a cumulative period of more than one minute in any hour; or the interior ambient noise level plus 10 dBA shall not be exceeded for any period of time (i.e., 65 and 55 dBA L_{max} during daytime and nighttime, respectively). If the ambient noise level exceeds either of the first two noise limit categories above, the cumulative period applicable to such category shall be increased to reflect such ambient noise level. If the ambient noise level exceeds the third noise limit category, the maximum allowable noise level under such category shall be increased to reflect the maximum ambient noise level.

2.4 Thresholds of Significance

Traffic Noise. A proposed project would normally have a significant off-site traffic noise impact if both of the following criteria are met:

Long-term project traffic will cause a noise level increase of 3 dBA or more on a roadway segment adjacent to a noise-sensitive land use in the project vicinity. Noise-sensitive land uses include the following: residential (single-family, multifamily, duplex, mobile home); transient lodging (e.g., hotels, motels); nursing homes; hospitals; parks, playgrounds, and recreation areas; and schools. The resulting "future with project" noise level exceeds the noise standard for sensitive land uses as identified in the City of Lake Forest General Plan (refer to Table E above).

Stationary Noise. The Noise Ordinance for the City of Lake Forest set limits on the level and duration of time a stationary noise source may impact a residential area. The determination that a project has the potential to exceed the City's established noise limits is typically based on a noise technical report prepared by a qualified acoustical consultant. The project would normally have a significant noise impact if it would:

Exceed the stationary-source noise criteria for the City of Lake Forest as described in the City of Lake Forest Noise Ordinance.

3.0 IMPACTS AND MITIGATION MEASURES

3.1 Short-Term Construction-Related Impacts

Construction-related noise impacts from the proposed project would not be considered adverse; in addition, compliance with the City's construction hours requirement would reduce the impact to a less than significant level.

Short-term noise impacts would be associated with excavation, grading, and erecting of buildings on site during construction of the proposed project. Construction-related short-term noise levels would be higher than existing ambient noise levels in the project area today, but would no longer occur once construction of the project is completed.

Two types of short-term noise impacts could occur during the construction of the proposed project. First, construction crew commutes and the transport of construction equipment and materials to the site for the proposed project would incrementally increase noise levels on access roads leading to the site. Although there would be a relatively high single-event noise exposure potential causing intermittent noise nuisance (passing trucks at 50 ft would generate up to a maximum of 87 dBA), the effect on longer term (hourly or daily) ambient noise levels would be small. Therefore, short-term construction-related impacts associated with worker commute and equipment transport to the project site would be less than significant.

The second type of short-term noise impact is related to noise generated during excavation, grading, and building erection on the project site. Construction is completed in discrete steps, each of which has its own mix of equipment, and consequently, its own noise characteristics. These various sequential phases would change the character of the noise generated on the site, and therefore, the noise levels surrounding the site as construction progresses. Despite the variety in the type and size of construction equipment, similarities in the dominant noise sources and patterns of operation allow construction-related noise ranges to be categorized by work phase. Table F lists typical construction equipment noise levels recommended for noise impact assessments, based on a distance of 50 ft between the equipment and a noise receptor, taken from the FHWA Roadway Construction Noise Model (RCNM; *FHWA Highway Construction Noise Handbook,* August 2006).

Typical noise levels range up to 90 dBA L_{max} at 50 ft during the noisiest construction phases. The site preparation phase, which includes excavation and grading of the site, tends to generate the highest noise levels because the noisiest construction equipment is earthmoving equipment. Earthmoving equipment includes excavating machinery such as backfillers, bulldozers, draglines, and front loaders. Earthmoving and compacting equipment includes compactors, scrapers, and graders. Typical operating cycles for these types of construction equipment may involve 1 or 2 minutes of full-power operation followed by three or four minutes at lower power settings.

Construction of the proposed project is expected to require the use of earthmovers, bulldozers, and water and pickup trucks. This equipment would be used on the project site. Based on the information in Table F, the maximum noise level generated by each scraper on the proposed project site is assumed to be 84 dBA L_{max} at 50 ft from the scraper. Each bulldozer would also generate 82 dBA L_{max} at 50 ft. The maximum noise level generated by water and pickup trucks is approximately 75 dBA L_{max} at 50 ft from these vehicles. Each doubling of the sound sources with equal strength increases the noise level by 3 dBA. Assuming that each piece of construction equipment operates at some distance from the other equipment, the worst-case combined noise level during this phase of construction would be 91 dBA L_{max} at a distance of 50 ft from the active construction area.

There are no existing residences immediately adjacent to the project site. The closest residential uses are located approximately 1,500 ft to the south/southeast and will receive more than 30 dBA in noise attenuation from distance divergence and terrain shielding. However, based on the project's proposed phasing, residences in the first few phases may be exposed to noise from building construction in later

Table F: RCNM Default Noise Emission Reference Levels and Usage Factors

Equipment Description	Impact Device?	Acoustical Usage Factor	Spec. 721.560 L_{max} at 50 ft (dBA, slow)	Actual Measured L_{max} at 50 ft (dBA, slow)	Number of Actual Data Samples (Count)
All other Equipment > 5 HP	No	50	85	N/A	0
Backhoe	No	40	80	78	372
Blasting	Yes	N/A	94	N/A	0
Boring Jack Power Unit	No	50	80	83	1
Chainsaw	No	20	85	84	46
Clam Shovel (dropping)	Yes	20	93	87	4
Compactor (ground)	No	20	80	83	57
Compressor (air)	No	40	80	78	18
Concrete Mixer Truck	No	40	85	79	40
Concrete Saw	No	20	90	90	55
Crane	No	16	85	81	405
Dozer	No	40	85	82	55
Dump Truck	No	40	84	76	31
Excavator	No	40	85	81	170
Flatbed Truck	No	40	84	74	4
Front-End Loader	No	40	80	79	96
Generator	No	50	82	81	19
Generator (< 25 kVA, VMS Signs)	No	50	70	73	74
Grader	No	40	85	N/A	0
Jackhammer	Yes	20	85	89	133
Paver	No	50	85	77	9
Pickup Truck	No	40	55	75	1
Pneumatic Tools	No	50	85	85	90
Pumps	No	50	77	81	17
Rock Drill	No	20	85	81	3
Roller	No	20	85	80	16
Scraper	No	40	85	84	12
Shears (on backhoe)	No	40	85	96	5
Soil Mix Drill Rig	No	50	80	N/A	0
Tractor	No	40	84	N/A	0
Vacuum Excavator (Vac-Truck)	No	40	85	85	149
Vacuum Street Sweeper	No	10	80	82	19
Vibratory Concrete Mixer	No	20	80	80	1
Vibratory Pile Driver	No	20	95	101	44
Warning Horn	No	5	85	83	12
Welder/Torch	No	40	73	74	5

Source: FHWA *Highway Construction Noise Handbook* (August 2006).
dBA = A-weighted decibels
ft = foot/feet
ft-lb/blow = foot-pounds per blow
HP = horsepower
kVA = kilovolt-ampere(s)
L_{max} = maximum instantaneous noise level
N/A = Not Applicable
Spec. = Specification
VMS = variable message sign

phases. The project will be required to comply with the construction hours specified in the City's Noise Ordinance, which states that construction activities are generally prohibited between 8:00 p.m. and 7:00 a.m. the following day from Monday through Saturday, and no construction is permitted on Sundays and federal holidays. As construction would not occur except during the times permitted in the Noise Ordinance, and as Section 11.16.020 of the Municipal Code allows construction noise in excess of standards to occur between these hours, the project would not violate established standards and would be less than significant.

3.2 Long-Term Traffic Noise Impacts

Project-related long-term vehicular trip increases are anticipated to be small when distributed to adjacent street segments. The proposed on-site residential uses would be directly adjacent to Portola Parkway, Rancho Parkway, and SR-241; would be potentially exposed to traffic noise levels exceeding the exterior noise standard of 65 dBA CNEL; and/or would potentially exceed the interior noise standard of 45 dBA CNEL from exterior noise sources. Mitigation measures would be required.

The FHWA highway traffic noise prediction model (FHWA RD-77-108) was used to evaluate highway traffic-related noise conditions along the roadway segments in the project vicinity. The typical vehicle mix for Southern California was used.

Table G provides the traffic noise levels along the roadways adjacent to the project site under the existing with project traffic conditions. Tables H and I provide the traffic noise levels along the roadways adjacent to the project site under the opening year (2015) without and with project traffic conditions. Tables J and K provide the traffic noise levels along the roadways adjacent to the project site under the cumulative (2030) without and with project traffic conditions. These noise levels represent the worst- case scenario, which assumes that no shielding is provided between the traffic and the location where the noise contours are drawn. The specific assumptions used in developing these noise levels and model printouts are provided in Appendix A.

Off-Site Traffic Noise Impacts. A doubling of the traffic volume is needed for a 3 dB increase in traffic noise. Tables G, I, and K show the traffic noise levels for the with project scenario for the existing, 2015, and 2030 conditions, respectively. The project-related traffic noise level increase would be 0.4 dBA or less for the existing and opening year (2015) with project conditions. For the cumulative (2030) condition, the project-related traffic noise level would be lower than in the no project scenario, where a commercial project would be constructed on the project site in place of the project. The project-related traffic noise level decrease along roadway segments in the project vicinity would be up to 1.2 dBA (along Rancho Parkway between Lake Forest Drive and the Sports Park). Because there are no noise-sensitive land uses in the project vicinity that would be exposed to traffic noise levels exceeding the City's noise standards or a more than 3 dBA increase over the no project scenario, as shown in Tables G, I, and K, no significant off-site traffic noise impacts would occur and no mitigation measures would be required for off-site land uses.

Table G: Existing with Project Traffic Noise Levels

Roadway Segment	ADT	Centerline to 70 CNEL (ft)	Centerline to 65 CNEL (ft)	Centerline to 60 CNEL (ft)	CNEL (dBA) 50 ft from Centerline of Outermost Lane	Increase CNEL (dBA) 50 ft from Centerline of Outermost Lane
Rancho Pkwy. west of Lake Forest Dr.	8,300	< 50	82	170	65.7	0.0
Rancho Pkwy. between Lake Forest Dr. and Sports Park	9,600	< 50	89	187	66.4	0.4
Rancho Parkway between Sports Park and Portola Pkwy.	8,700	< 50	84	175	65.9	0.3
Lake Forest Dr. north of Rancho Pkwy.	16,300	62	125	265	68.7	0.1
Lake Forest Dr. south of Rancho Pkwy.	18,900	67	137	292	69.3	0.1
Portola Pkwy. north of Rancho Pkwy.	24,200	78	161	344	70.4	0.1
Portola Pkwy. south of Rancho Pkwy.	31,000	91	190	406	71.4	0.0
SR-241 toll road	39,900	190	403	866	75.7	0.0

Source: LSA Associates, Inc. (October 2013).
Notes: Traffic noise within 50 ft of the roadway centerline should be evaluated with site-specific information.
Modeled using the "Soft" setting and the Orange County default fleet percentages on Rancho Parkway, and Caltrans data for the SR-241 toll road.
ADT = average daily traffic
Caltrans = California Department of Transportation
CNEL = Community Noise Equivalent Level
dBA = A-weighted decibels
ft = foot/feet
SR-241 = State Route 241

Table H: Opening Year (2015) without Project Traffic Noise Levels

Roadway Segment	ADT	Centerline to 70 CNEL (ft)	Centerline to 65 CNEL (ft)	Centerline to 60 CNEL (ft)	CNEL (dBA) 50 ft from Centerline of Outermost Lane
Rancho Pkwy. west of Lake Forest Dr.	12,000	< 50	103	217	67.3
Rancho Pkwy. between Lake Forest Dr. and Sports Park	12,000	< 50	103	217	67.3
Rancho Parkway between Sports Park and Portola Pkwy.	12,000	< 50	103	217	67.3
Lake Forest Dr. north of Rancho Pkwy.	22,700	75	155	330	70.1
Lake Forest Dr. south of Rancho Pkwy.	29,900	89	185	396	71.3
Portola Pkwy. north of Rancho Pkwy.	31,400	91	191	409	71.5
Portola Pkwy. south of Rancho Pkwy.	42,600	111	234	502	72.8
SR-241 toll road	53,800	230	491	1,056	77.0

Source: LSA Associates, Inc. (October 2013).
Note: Traffic noise within 50 ft of the roadway centerline should be evaluated with site-specific information.
Modeled using the "Soft" setting and the Orange County default fleet percentages on Rancho Parkway and Caltrans data for the SR-241 toll road extrapolated using the same growth rate as the traffic study developed for Rancho Parkway.
ADT = average daily traffic
Caltrans = California Department of Transportation
CNEL = Community Noise Equivalent Level
dBA = A-weighted decibels
ft = foot/feet
SR-241 = State Route 241

Table I: Opening Year (2015) with Project Traffic Noise Levels

Roadway Segment	ADT	Centerline to 70 CNEL (ft)	Centerline to 65 CNEL (ft)	Centerline to 60 CNEL (ft)	CNEL (dBA) 50 ft from Centerline of Outermost Lane	Increase CNEL (dBA) 50 ft from Centerline of Outermost Lane
Rancho Parkway west of Lake Forest Dr.	12,000	< 50	103	217	67.3	0.0
Rancho Parkway between Lake Forest Dr. and Sports Park	12,700	< 50	107	225	67.6	0.3
Rancho Parkway between Sports Park and Portola Pkwy.	12,600	< 50	106	224	67.5	0.2
Lake Forest Dr. north of Rancho Pkwy	23,000	76	156	333	70.1	0.0
Lake Forest Dr. south of Rancho Pkwy	30,300	89	187	400	71.3	0.0
Portola Pkwy north of Rancho Pkwy	32,300	93	195	417	71.6	0.1
Portola Pkwy south of Rancho Pkwy	43,300	112	236	507	72.9	0.1
SR-241 toll road	53,800	230	491	1,056	77.0	0.0

Source: LSA Associates, Inc. (October 2013).
Note: Traffic noise within 50 ft of the roadway centerline should be evaluated with site-specific information.
Modeled using the "Soft" setting and the Orange County default fleet percentages on Rancho Parkway, and Caltrans data for the SR-241 toll road extrapolated using the same growth rate as the traffic study developed for Rancho Parkway.
ADT = average daily traffic
Caltrans = California Department of Transportation
CNEL = Community Noise Equivalent Level
dBA = A-weighted decibels
ft = foot/feet
SR-241 = State Route 241

Table J: Future Year (2030) without Project Traffic Noise Levels

Roadway Segment	ADT	Centerline to 70 CNEL (ft)	Centerline to 65 CNEL (ft)	Centerline to 60 CNEL (ft)	CNEL (dBA) 50 ft from Centerline of Outermost Lane
Rancho Pkwy. west of Lake Forest Dr.	20,000	69	143	304	69.5
Rancho Pkwy. between Lake Forest Dr. and Sports Park	27,000	83	173	370	70.8
Rancho Pkwy. between Sports Park and Portola Pkwy.	27,000	83	173	370	70.8
Lake Forest Dr. north of Rancho Pkwy.	27,600	84	176	376	70.9
Lake Forest Dr. south of Rancho Pkwy.	36,800	101	212	455	72.2
Portola Pkwy. north of Rancho Pkwy.	33,900	96	201	431	71.8
Portola Pkwy. south of Rancho Pkwy.	51,500	125	265	569	73.6
SR-241 toll road	121,100	392	843	1,814	80.5

Source: LSA Associates, Inc. (October 2013).
Notes: Traffic noise within 50 ft of the roadway centerline should be evaluated with site-specific information.
Modeled using the "Soft" setting and the Orange County default fleet percentages on Rancho Parkway, and Caltrans data for the SR-241 toll road extrapolated using the same growth rate as the traffic study developed for Rancho Parkway.
ADT = average daily traffic
Caltrans = California Department of Transportation
CNEL = Community Noise Equivalent Level
dBA = A-weighted decibels
ft = foot/feet
SR-241 = State Route 241

Table K: Future Year (2030) with Project Traffic Noise Levels

Roadway Segment	ADT	Centerline to 70 CNEL (ft)	Centerline to 65 CNEL (ft)	Centerline to 60 CNEL (ft)	CNEL (dBA) 50 ft from Centerline of Outermost Lane	Increase CNEL (dBA) 50 ft from Centerline of Outermost Lane
Rancho Pkwy. west of Lake Forest Dr.	19,400	68	140	298	69.4	-0.1
Rancho Pkwy. between Lake Forest Dr. and Sports Park	20,300	70	144	307	69.6	-1.2
Rancho Pkwy. between Sports Park and Portola Pkwy.	21,500	73	149	318	69.9	-0.9
Lake Forest Dr. north of Rancho Pkwy.	25,600	81	167	358	70.6	-0.3
Lake Forest Dr. south of Rancho Pkwy.	33,800	96	201	430	71.8	-0.4
Portola Pkwy. north of Rancho Pkwy.	32,900	94	197	422	71.7	-0.1
Portola Pkwy. south of Rancho Pkwy.	48,600	120	255	547	73.4	-0.2
SR-241 toll road	121,100	392	843	1,814	80.5	0.0

Source: LSA Associates, Inc. (October 2013).
Notes: Traffic noise within 50 ft of the roadway centerline should be evaluated with site-specific information.
Modeled using the "Soft" setting and the Orange County default fleet percentages on Rancho Parkway, and Caltrans data for the SR-241 toll road extrapolated using the same growth rate as the traffic study developed for Rancho Parkway.
ADT = average daily traffic
Caltrans = California Department of Transportation
CNEL = Community Noise Equivalent Level
dBA = A-weighted decibels
ft = foot/feet
SR-241 = State Route 241

On-Site Traffic Noise Impacts. Table K shows that several roadway segments that would be directly adjacent to the project site would have the 65 dBA CNEL noise contour extending to beyond the roadway right-of-way. Therefore, outdoor living areas associated with the proposed residential uses would be within the 65 dBA CNEL noise impact zone from these roadway segments in the project area:

- Portola Parkway within 197 ft of the roadway centerline;
- Rancho Parkway with 149 ft of the roadway centerline; and
- SR-241 within 843 ft of the centerline.

Based on the preliminary grading plan for the project site (prepared by Hunsaker & Associates, November 14, 2013), there are variations in the elevation for the proposed on-site residential uses and major roadways (Portola Parkway, Rancho Parkway, and SR-241) surrounding the project site. The elevation difference between the roads and the proposed on-site residential units would provide noise shielding from the embankment of the higher side. The following summarizes the elevation differences between these major roadways and the residential units in different phases and potential noise attenuation from the elevation differences:

- Sites along Portola Parkway vary from 20 ft below the road (12 dBA or more in noise attenuation) in the north to 20 ft above the road (10 dBA or more in noise reduction) in the south.
- Sites along Rancho Parkway vary from 3 ft above the road (2 dBA in noise attenuation) in the west to 20 ft above the road (10 dBA or more in noise attenuation) in the east.

- Sites along SR-241 vary from 7 ft below the road (5 dBA in noise attenuation) in the west to 65 ft below the road (12 dBA or more in noise attenuation) in the east, with an earthen berm that runs from east to west from 35 ft below the SR-241 to level with the toll road.

Based on the project's conceptual site plan (Bassenian/Lagoni Architecture Planning Interiors, September 3, 2013), there are single-family dwelling units proposed along these three roadways. Along Portola Parkway, frontline home lots are approximately 140 ft (67.4 dBA CNEL without shielding from elevation difference) to 410 ft (60.2 dBA CNEL without shielding from elevation difference) from the roadway centerline. Along Rancho Parkway, there are single-family residential lots that would be 60 ft (71.3 dBA CNEL without shielding from elevation difference) to 80 ft (69.4 dBA CNEL without shielding from elevation difference) from the roadway centerline. Along SR-241, there are single-family residential lots that would be 130 ft (77.2 dBA CNEL without shielding from elevation difference) to 320 ft (71.3 dBA CNEL without shielding from elevation difference) from the toll road centerline.

These residential units along the three roadways would be potentially exposed to traffic noise exceeding the City's 65 dBA CNEL exterior noise standard for the outdoor living area without shielding provided by the elevation difference between the road and these residential units.

With the potential noise attenuation from elevation difference included, traffic noise would be reduced at the following on-site residential areas:

- The lots along Portola Parkway that are 20 ft below (-12 dBA or more) to 20 ft above (-10 dBA or more) the road would be exposed to traffic noise levels ranging from 48.2 to 57.4 dBA CNEL.
- The lots along Rancho Parkway that are 3 ft above the road (-2 dBA) to 20 ft above (-10 dBA or more) the road would be exposed to traffic noise levels reaching 59.4 dBA CNEL. Those that are at the west end would be potentially exposed to traffic noise levels reaching 69.3 dBA CNEL in the middle and to the west.
- The lots along SR-241 that are 7 ft below (-5 dBA or more) the toll road would be exposed to traffic noise levels reaching 72.2 dBA CNEL in the west. Those that are 65 ft below the toll road (-12 dBA) would be exposed to traffic noise levels reaching 59.7 dBA CNEL in the east.

Based on the above analysis, the following mitigation measures are recommended for the residential units within the noise impact zones along the three roadways:

- **Portola Parkway:** For homes on pads with elevations more than 20 ft below or above the elevation of the road, no mitigation measure is required for outdoor living areas. Those dwelling units that are within 5 ft of the roadway elevation require a noise barrier with a minimum height of 5 ft around the perimeter of the outdoor living areas. Second-floor balcony, if any, would receive less noise attenuation, and mitigation measures such as noise barriers with 5 ft minimum height would be required along the perimeter of the outdoor living areas.
- **Rancho Parkway:** For homes on pads with elevations within 4 ft of the road elevation, a 5 ft high sound barrier along the perimeter of the backyard or patio and a 5 ft high sound barrier along the perimeter of any second-floor balcony would be required for the outdoor living areas. A sound barrier constructed along the project boundary along Rancho Parkway with minimum

height of 5 ft above ground could replace the above recommended sound walls along the perimeter of the backyard/patio.

- **SR-241:** For homes along SR-214, a 10 ft high sound barrier along the property line along SR-241 for home lots within 10 ft of the SR-241 elevation at the west end, stepping down to 8 ft high sound barrier for home lots that are between 10 to 15 ft of the SR-241 elevation, and stepping down to 6 ft high for home lots that are between 15 ft and 20 ft below the SR-241 in the middle. For home lots that are more than 20 ft below the SR-241, no sound wall would be required.

The proposed noise barriers must consist of materials with a minimum density of 3.5 pounds per square foot or a combination of materials that meet this requirement. Such barrier materials include, but are not limited to, the following: ¾-inch plywood, ¼-inch tempered glass, ¼-inch laminated glass, ¼-inch Plexiglas, or masonry.

With the 24 dBA exterior-to-interior noise attenuation provided by the standard building shell in warm climate when windows are closed (Protective Noise Levels, Environmental Protection Agency [EPA] 550/9-79-100, November 1978), the proposed residential structures within the 69 dBA CNEL noise impact zone from these roadway segments in the project area would need additional building facade upgrades:

- **SR-241:** Windows with Sound Transmission Class (STC)-28 or higher for ground-floor units and windows with STC-32 or higher for second-floor units for homes in the middle and to the west.
- **Rancho Parkway:** Windows with STC-28 or higher for ground-floor units and windows with STC-30 or higher for second-floor units for homes in the middle and to the west end.

Proposed residential units along Portola Parkway would be outside of the 69 dBA CNEL impact zone with implementation of the noise barriers. Therefore, no building facade upgrades, such as windows with STC ratings higher than standard building construction provides, are required for these interior noise-sensitive rooms (bedrooms and living room).

Mechanical ventilation, such as air-conditioning, would be required for noise-sensitive rooms that are exposed to traffic noise exceeding 57 dBA CNEL, due to only 12 dBA exterior-to-interior noise attenuation provided by standard building shell in warm climate when windows are open (Protective Noise Levels, EPA 550/9-79-100, November 1978). Residential units within the following areas without natural or manmade structures to shield the traffic noise would be exposed to traffic noise exceeding 57 dBA CNEL from these roadway segments in the project area:

- Portola Parkway;
- Rancho Parkway; and
- SR-241.

The recreational area proposed on the project site is shielded by the residential structures and is not directly exposed to major streets in the project area. Therefore, no significant traffic noise impacts would be expected to affect the recreational area.

3.3 Long-Term Stationary-Source Impacts

As noise spreads from a source it loses energy, so that the farther away the noise receiver is from the noise source, the lower the perceived noise level would be. Geometric spreading causes the sound level to attenuate or be reduced, resulting in a 6 dBA reduction in the noise level for each doubling of distance from a single point source of noise, such as an idling truck, to the noise-sensitive receptor of concern.

The proposed on-site residential uses would be potentially exposed to noise from truck delivery and loading/unloading activities, as well as other activities at the parking lot associated with existing commercial/industrial uses to the west and Sports Park activities south of the project site. These activities are potential point sources of noise that could affect noise-sensitive receptors adjacent to the loading areas or Sports Park, such as proposed residential uses on the project site. Mitigation measures may be required to comply with the City's noise standards.

The existing commercial/industrial uses to the west have the nearest loading/unloading areas, located approximately 200 ft from the project boundary. Noise associated with loading/unloading activities at these commercial/industrial uses would potentially affect on-site residences if they are located near the project boundary. Other off-site, noise-producing activities may include outdoor air-conditioning units, parking, traffic, and pedestrian activity within the parking lot of the commercial/industrial uses. Most of the events are intermittent in nature and usually of a very short duration, lasting a few seconds. The combination of the intermittent activities, even over the course of a day, does not amount to a significant amount of time.

Truck Delivery and Loading/Unloading. Delivery trucks (including Federal Express, United Parcel Service, and other trucks) and loading/unloading (including forklift) operations for the existing commercial/industrial uses would result in maximum noise readings similar to loading and unloading activities for other projects, which generate a noise level of 75 dBA L_{max} at 50 ft and are used in this analysis. Based on the above discussion, loading/unloading noise would be reduced by the 200 ft distance divergence to 63 dBA L_{max} or lower at ground level of the nearest on-site location for residential uses. This range of maximum noise levels is lower than the City's exterior noise standards of 75 dBA L_{max} during the day (7:00 a.m.–10:00 p.m.) and 65 dBA L_{max} during the night (10:00 p.m.–7:00 a.m.). Since there would not be nighttime activities at the adjacent commercial/industrial uses, the nighttime maximum noise level standard is not expected to be violated.

Although typical truck unloading processes take an average of 15–20 minutes, this maximum noise level occurs in a much shorter period of time (i.e., just a few minutes). However, if the loading/unloading activities last for more than 15 minutes in any hour, the City's 60 dBA noise level exceeded 25 percent of the time (L_{25}) standard that is not to be exceeded for more than 15 minutes in any hour would be violated. Because the City's noise standard of 60 dBA that should not be exceeded for more than 15 minutes in any hour during the daytime hours would be potentially exceeded, mitigation measures, such as a sound barrier with a minimum height of 6 ft along the project boundary directly adjacent to the loading/unloading areas of the existing commercial/industrial uses would be required.

Parking Lot Activity. Representative parking activities, such as employees conversing and doors slamming, would generate approximately 60 dBA L_{max} at 50 ft. This level of noise is much lower than that of the truck delivery and loading/unloading activities. With the noise attenuation effect from the distance divergence, noise in the parking lot would be attenuated to below 48 dBA L_{max} and is not anticipated to be a significant noise issue with respect to residences proposed on the project site.

Sports Park. The proposed residential uses would be exposed to activities occurring at the Sports Park to the south of the project site. Major noise-generating activities, such as competitive sports games, would occur at the Sports Park. Therefore, significant stationary noise impacts would potentially occur with implementation of the proposed project. Mitigation measures would therefore be required.

During a sports event, spectators, players, and coaches would generate relatively loud noise. However, a single daytime or nighttime event, even with relatively high noise-generating activities—such as periodic whistles, loud talk, players yelling on the fields, and cheering, yelling, and applause from spectators—would not necessarily result in the CNEL exceeding the 65 dBA CNEL City noise standard for residential uses. For example, many areas adjacent to an airport or a freeway may experience high single event noise from overhead aircraft exceeding 85 dBA L_{max} or heavy-duty trucks exceeding 75 dBA L_{max}, but they may still be outside the 60 dBA CNEL noise contour from the airport or the freeway. A noisy event generating 70 dBA L_{max} and lasting for 1 hour may be averaged down to a much lower CNEL if sound levels during the remainder of the 24-hour period are 50 dBA or lower. The emphasis is that CNEL is a weighted, 24-hour average noise scale, not an instantaneous noise level denoted by a simple dBA reading. A single event at the Sports Park that generates an instantaneous noise level several times higher than the ambient or background noise level without that particular event does not necessarily represent a violation of the City's noise standard, as described in the General Plan, or the City's noise ordinance. As long as the CNEL levels identified in the City's General Plan and noise ordinance are not exceeded, no violation of the City's noise standard would occur. Furthermore, if the City's 75 dBA L_{max} maximum noise level during daytime hours is not exceeded, no significant "sudden noise" startling effect would occur.

Because no activity schedule is available for the neighboring Sports Park, for operational noise impact analysis, it is assumed that during a peak use day, there could be up to 94 people at one time at each of the sports field of the Sports Park for games or competition, including players, coaches and umpires, and spectators. Peak use days would occur only when use is maximized (e.g., during the summer months or on weekends) and when more games versus practices are occurring, resulting in more people in attendance. This means that for the Sports Park, which is assumed to include three sports fields adjacent to the project site, there could be up to 282 people present at the three closest playfields at one time. Therefore, as a worst-case scenario for this noise analysis, it is assumed that a total of 282 people (assuming half male and half female for spectators), including players and spectators, would be present at the same time at the Sports Park.

However, for a typical day, the following scenario is more likely to occur at each field of the proposed Sports Park: a total of 60 people at the three fields with all 60 people making noise at the same time, assuming that a weekday practice would consist of 15 people per team, including 12 players and 3 coaches. Some parents may choose to watch practice, making it a maximum of 20 people present per team. Because only one team practices on the field at a time, the three fields

adjacent to the project site would have a maximum of 60 people total for a typical weekday practice. The "typical day" scenario is included in this analysis because it is assumed that the Sports Park would not be fully used to its maximum capacity every day (e.g., on weekdays during the school year or during the winter months, and when practices as opposed to games are occurring, resulting in fewer people in attendance). This scenario reflects the more typical noise levels that residents would experience. Because male voice levels are higher than those of females, for a worst-case scenario, it is assumed that all 12 players and 3 coaches on a team are males. It is further assumed that among the participating parents, half of them are males and half of them are females. Therefore, out of the 60 people on the three fields, there will be 52 males and 8 females under the typical day scenario.

The *Handbook of Acoustical Measurements and Noise Control* (1991) lists average sound levels for different male and female vocal efforts (i.e., shouting/yelling, loud voice, and raised voice).[1] The average A-weighted vocal sound levels under quiet conditions for these three vocal categories include: 88 dBA for male shouting and 82 dBA for female shouting, 75 dBA for a male loud voice and 71 dBA for a female loud voice, and 65 dBA for a male raised voice and 62 dBA for a female raised voice. These are all maximum sound pressure levels (L_{max}) measured at 1 meter (m), or 3 ft, from the person in a free field.[2]

In acoustics, every doubling of an equal sound energy would result in a 3 dBA increase in combined noise level. Therefore, 2 males shouting at the same time (which assumes a worst-case scenario with combined voice levels reaching the peak noise level at the same time) would result in a noise level of 91 dBA at 1 m (3 ft); 4 males shouting would result in a noise level of 94 dBA; 8 males, 97 dBA; 16 males, 100 dBA; 32 males, 103 dBA; 47 males, 105 dBA; 40 males, 104 dBA; 64 males, 106 dBA; 94 males, 108 dBA; and 141 males, 109 dBA. Similarly, for females shouting, 2 would result in a noise level of 85 dBA at 3 ft; 4 females, 88 dBA; 8 females, 91 dBA; 16 females, 94 dBA; 32 females, 97 dBA; 39 females, 98 dBA; 47 females, 99 dBA; 64 females, 100 dBA; 94 females, 102 dBA, and 141 females, 96 dBA. These calculations demonstrate that as the number of people increases from 1 to 141, the peak noise level increases by 21 dBA. It should be noted that these calculations represent the worst-case scenario due to the fact that it is rarely possible for 141 people to simultaneously reach a peak vocal level. In addition, it is impossible to maintain a distance of 3 ft from all 141 people since each person is assumed to remain a point source.

Using the same methodology described above, 141 males speaking with a loud voice would result in an increase in noise level from 75 dBA (for one male) to 96 dBA at 3 ft, and 141 females would result in an increase in noise level from 71 dBA (for one female) to 92 dBA at 3 ft. For a raised voice, 141 males would result in a noise level of 86 dBA at 3 ft, and 141 females would result in a noise level of 83 dBA at 3 ft. The first two rows of Table L lists these different voice levels measured at 3 ft.

The following discussions evaluate the projected noise impacts from the Sports Park on the proposed on-site residences.

1 Harris, Cyril M., ed., 1991. *Handbook of Acoustical Measurements and Noise Control*, Third Edition.
2 Ibid.

Residences along Rancho Parkway. The shortest distance between the bleachers at the nearest proposed sports fields at the Sports Park and residences to the north along Rancho Parkway is approximately 350 ft. These residences would be at elevations similar to the completed sports fields.

Table L: Player and Spectator Noise at Residences along Rancho Parkway (dBA)

Number of People/Distance/ Time Duration	Shouting/Yelling		Loud Voice		Raised Voice	
	Male	Female	Male	Female	Male	Female
1 person at 3 ft (1 m), instant	88	82	75	71	65	62
141 people at 3 ft, instant	109	103	96	92	86	83
141 people at 350 ft, instant	68	62	55	51	45	42
188 people at 350 ft, instant	69		56.5		46.8	
188 people at 350 ft, L_{eq} for 2 hours[1]	58.9					
2-hour event 24-hour CNEL[2]	58.9					
4-hour event 24-hour CNEL[3]	59.2					
10-hour event 24-hour CNEL[3]	59.3					
City Standard[4]	< 65					

Source: LSA Associates, Inc. (November 2013).

1 Assumes 10 minutes of shouting, 20 minutes of loud voices, and 90 minutes of raised voices.

2 Assumes ambient noise of 60 dBA during the day and evening (7:00 a.m. to 10:00 p.m.) and 50 dBA during the night (10:00 p.m. to 7:00 a.m.) other than the 2-hour daytime or evening hours (7:00 a.m. to 10:00 p.m.) sports event.

3 Assuming 3 hours of sports event occurring during evening hours (7 p.m. to 10 p.m.) as a worst case scenario.

4 Normally acceptable for residential uses.

CNEL = Community Noise Equivalent Level
dBA = A-weighted decibels
ft = foot/feet
L_{eq} = equivalent continuous noise level
m = meter(s)

At a distance of 350 ft, the distance attenuation would provide approximately 41 dBA in noise reduction, compared to the noise level at 1 m (3 ft) from the point source(s). Therefore, the noise levels referenced above for 141 people shouting would be reduced to 68 dBA L_{max} for males and 62 dBA L_{max} for females. The noise level for 141 people speaking in loud voices would be reduced to 55 dBA L_{max} for males and 51 dBA L_{max} for females. The resulting noise levels for 141 people speaking in raised voices would be reduced to 45 dBA L_{max} for males and 42 dBA L_{max} for females. This analysis assumes that a total of 282 players and spectators consisting of 141 males and 141 females would be present during a scheduled sports event at the three closest fields at the Sports Park. The analysis assumes that over a 2-hour period, all 282 people would shout at the same time for a cumulative total of 10 minutes, which would generate a combined 69 dBA instantaneous noise level; speak in loud voices for a cumulative total of 20 minutes, which would generate a combined 56.5 dBA instantaneous noise level; and talk in raised voices for a cumulative total of 90 minutes, which would generate a combined 46.8 dBA instantaneous noise level. Table L shows that the L_{eq} at a distance of 350 ft would be 58.9 dBA L_{eq} during the 2-hour period. It is also noted that, under the worst-case scenario, if all 282 people shout or yell at the same time, the combined noise level would not exceed the City's daytime exterior noise standard of 75 dBA L_{max} for residential uses at the nearest residences. It would also not exceed the City's 70 dBA L_{max} nighttime exterior noise standard. Therefore, no noise mitigation is required.

To obtain a 24-hour weighted CNEL, 24 hourly L_{eq}s are required. In the area along Rancho Parkway, daytime and evening (7:00 a.m. to 10:00 p.m.) ambient noise is assumed to be 60 dBA, while nighttime (10:00 p.m. to 7 a.m.) ambient noise is assumed to be 50 dBA. Therefore, the noise generated by 282 players and spectators during a 2-hour sports event would result in a noise level of 58.9 dBA CNEL for an event occurring between 7:00 a.m. and 10:00 p.m.

Table L lists step by step the procedure by which these noise levels were calculated. It shows that a 2-hour sports event at the nearest three fields at the Sports Park with up to 282 players and spectators would potentially result in a noise level of 58.9 dBA CNEL at 350 ft. This noise level would not exceed the 65 dBA CNEL normally acceptable exterior noise standard for residential uses if the event occurs between the hours of 7:00 a.m. and 10:00 p.m. Because the Sports Park fields have a lighting curfew after 10:30 p.m., all sports events would stop after that time. Even if sports events at the Sports Park last all day (i.e., up to 10 hours with 3 hours during the evening hours) during daytime and evening hours with a similar number of players and spectators, the cumulative noise level at the residences on the north side of Rancho Parkway closest to the proposed sports fields would not exceed the City's exterior noise standard of 65 dBA CNEL for residential uses.

As for the more typical day scenario, the analysis assumes that a total of 60 players and spectators consisting of 52 males and 8 females could be present during a scheduled sports event at the closest three sports fields at the Sports Park. Noise levels associated with this more typical day scenario would be much lower than the peak-event noise analyzed above and would not result in any significant noise impacts to the proposed on-site residences.

Interior Noise Standard. The typical maximum allowable interior noise levels for residential uses are 45 dBA between 10:00 p.m. and 7:00 a.m. and 50 dBA between 7:00 a.m. and 10:00 p.m. Typical sound level reduction of buildings in a warm climate such as Southern California is 12 dBA with windows opened and 24 dBA with windows closed (Protective Noise Levels, EPA 550/9-79-100, November 1978). Interior noise levels at the residences nearest the commercial uses, attributable to loading/unloading activities from the off-site loading areas, would be reduced to 51 dBA L_{max} with windows open and to 39 dBA L_{max} with windows closed. Standard building construction for residential structures would be sufficient to meet the interior noise standard when air-conditioning, a form of mechanical ventilation, is provided to ensure that windows can remain closed for prolonged periods of time.

Heating, Ventilating, and Air-Conditioning Units. The proposed residential units would be equipped with heating, ventilating, and air-conditioning (HVAC) units. All residential HVAC units will be designed to meet the City's Municipal Code noise requirements.

3.4 Standard Conditions

The City of Lake Forest Opportunities Study Program Environmental Impact Report (EIR) included several Standard Conditions for Noise, as listed below, that will be applicable to the proposed project as well:

N1 Prior to the issuance of a grading permit, the applicant shall produce written evidence, or other evidence deemed reasonably acceptable by the Director of Development Services, that all construction vehicles or equipment, fixed or mobile, operated within 1,000 feet of any residential dwelling unit shall be equipped with properly operating and maintained mufflers.

N2 Grading and construction activities shall be prohibited between the hours of 7:00 p.m. and 7:00 a.m., Monday through Friday; 6:00 p.m. and 8:00 a.m., Saturday; and at any time on Sunday or a federal holiday.

N3 Prior to the issuance of building permits for each structure or tenant improvement other than a parking structure, the applicant shall submit a final acoustical report prepared to the satisfaction of the Director of Development Services. The report shall show that the development will be sound attenuated against present and projected noise levels, including roadway and railroad, to meet City interior and exterior noise standards. In order to demonstrate that all mitigation measures have been incorporated into the project, the report shall be accompanied by a list identifying the sheet(s) of the building plans that include the approved mitigation measures.

3.5 Mitigation Measures

The City of Lake Forest Opportunities Study Program EIR included several mitigation measures for noise, as listed below, that will be applicable to the proposed project:

NM 3.10-1 A condition of approval shall be placed on all Site Development Permit approvals for site-specific developments, which states: Construction staging areas and operation of earth moving equipment on a project site shall be located more than 25 feet away from sensitive receptors (such as residences, schools, hospitals). If equipment will be operated within 25 feet of any sensitive receptor, the applicant shall prepare a construction plan which quantifies the anticipated vibration levels associated with the construction (in VdB) and the length of time the construction is to occur, and documents efforts to minimize impacts associated with groundborne vibration.

NM 3.10-2 Prior to the issuance of a Site Development Permit for site-specific development within the project area, the City shall conduct a tiered site-specific analysis under CEQA to determine whether the individual project will expose sensitive receptors to either a substantial increase in ambient noise resulting from increased traffic volumes generated by that project or excessive groundborne vibration or groundborne noise levels. Where significant impacts are identified, appropriate mitigation shall be required.

NM 3.10-3 A condition of approval shall be placed on all Site Development Permit approvals for site-specific development, which states: Prior to issuance of a building permit, the applicant shall submit plans for shielding of all HVAC equipment to provide noise attenuation that will reduce noise from HVAC systems to 65 dBA or less when measured at 50 feet from the noise source.

Mitigation Measures NM 3.10-1 and NM 3.10-3 shall be carried forward from the City's Opportunities Study Program EIR. As required by NM 3.10-2, this analysis provides the tiered site-specific analysis for the proposed project, and has identified the following site-specific mitigation measures.

Construction Impacts. Construction of the proposed project would potentially result in relatively high noise levels at the closest residences. In compliance with Mitigation Measure 3.10-2 to prepare a tiered, site-specific noise analysis to evaluate whether the project generates a substantial increase in ambient noise resulting from short-term construction noise, the following mitigation measures are required, and which, if implemented, will avoid exceedances of the City's noise standards and thresholds of significance. The following measures would reduce short-term construction-related noise impacts resulting from the proposed project:

- The project contractor shall place all stationary construction equipment so that emitted noise is directed away from sensitive receptors nearest the project site.
- The construction contractor shall locate equipment staging in areas that will create the greatest distance practical between construction-related noise sources and noise-sensitive receptors such as residential uses nearest the project site during all project construction.
- The construction contractor shall obtain the City's approval for its haul plan, with the planned haul truck routes avoiding residential areas to the extent feasible.
- The construction contractor shall schedule the timing and/or sequence so that the noisiest construction operations do not occur during sensitive times of the day (i.e., early morning hours between 7:00 a.m. and 8:00 a.m. or late afternoon hours between 6:00 p.m. and 8:00 p.m.)

Traffic Noise Impacts. In compliance with Mitigation Measure 3.10-2 to prepare a tiered, site-specific noise analysis, evaluate whether the project generates a substantial increase in ambient noise resulting from increased traffic volumes, and identify appropriate mitigation, the following mitigation measures are required which, if implemented, will avoid exceedances of the City's noise standards and thresholds of significance:

Sound Barriers. Outdoor living areas, such as backyards, patios, or balconies, within the following impact areas are required to be protected by stand-alone sound barriers:

- **Portola Parkway:** For homes on pads with elevations more than 20 ft below or above the elevation of the road, no mitigation measures would be required for outdoor living areas. These dwelling units that are within 5 ft of the roadway elevation require a noise barrier with a minimum height of 5 ft around the perimeter of the outdoor living areas. Mitigation measures such as noise barriers with 5 ft minimum height are required for any second-floor balcony along the perimeter of the outdoor living areas.
- **Rancho Parkway:** For homes on pads with elevations within 4 ft of the road elevation, a 5 ft high sound barrier along the perimeter of backyard or patio and a 5 ft high sound barrier along the perimeter of any second-floor balcony would be required. A sound barrier

constructed along the project boundary along Rancho Parkway with a minimum height of 5 ft above ground could replace the above recommended sound walls along the perimeter of the backyard/patio.

- **SR-241:** For homes along SR-214, a 10 ft high sound barrier along the property line along SR-241 for home lots within 10 ft of the SR-241 elevation at the west end, stepping down to 8 ft high sound barrier for home lots that are between 10 to 15 ft of the SR-241 elevation, and stepping down to 6 ft high for home lots that are between 15 ft and 20 ft below the SR-241 in the middle. For home lots that are more than 20 ft below the SR-241, no sound wall would be required.

The proposed noise barriers must consist of materials with a minimum density of 3.5 pounds per square foot or combination of materials that meet this requirement. Such barrier materials include, but are not limited to, the following: ¾-inch plywood, ¼-inch tempered glass, ¼-inch laminated glass, ¼-inch Plexiglas, or masonry.

Building Facade Upgrades. Noise-sensitive rooms, such as bedrooms and living rooms, within the following impact areas are required to have building facade upgrades:

- **SR-241:** Windows with STC-28 or higher for ground-floor units and windows with STC-32 or higher for second-floor units for homes in the middle and to the west end.
- **Rancho Parkway:** Windows with STC-28 or higher for ground-floor units and windows with STC-30 or higher for second-floor units for homes in the middle and to the west end.

Mechanical Ventilation/Air-Conditioning. Noise-sensitive rooms, such as bedrooms and living rooms, within the following impact areas are required to be equipped with air-conditioning, a form of mechanical ventilation:

- Portola Parkway;
- Rancho Parkway; and
- SR-241.

Stationary-Source Noise Impacts. No mitigation measures are required.

On-Site Heating, Ventilating, and Air-Conditioning Units. All residential HVAC units shall be designed to meet the City's Municipal Code noise requirements.

3.6 Level of Significance after Mitigation

With implementation of the identified mitigation measures, potential short-term and long-term noise impacts would be reduced to below a level of significance.

4.0 REFERENCES

Bolt, Beranek & Newman. 1987. Noise Control for Buildings and Manufacturing Plants.

City of Lake Forest. CEQA Significance Thresholds for Noise.

———. Noise Element and Municipal Code Noise Ordinances.

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———. *Highway Construction Noise Handbook.* August 2006. Roadway Construction Noise Model, FHWA-HEP-06-015. DOT-VNTSC-FHWA-06-02. NTIS No. PB2006-109012.

Harris, Cyril M., ed. 1991. *Handbook of Acoustical Measurements and Noise Control,* Third Edition.

RBF Consulting. 2013. *Traffic Impact Study.* October.

APPENDIX A

FHWA HIGHWAY TRAFFIC NOISE PREDICTION MODEL OUTPUT

TABLE Existing-01
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 10/23/2013
ROADWAY SEGMENT: Rancho Parkway west of Lake Forest Dr.
NOTES: Baker Ranch - Existing

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 8300 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 24 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 65.72

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL	70 CNEL	65 CNEL	60 CNEL	55 CNEL
	0.0	81.8	170.1	363.5

TABLE Existing-02
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 10/23/2013
ROADWAY SEGMENT: Rancho Parkway between Lake Forest Dr. and Sports Park
NOTES: Baker Ranch - Existing

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 8900 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 24 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 66.03

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	85.3	178.1	380.8

TABLE Existing-03
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 10/23/2013
ROADWAY SEGMENT: Rancho Parkway between Sports Park and Portola Pkwy.
NOTES: Baker Ranch - Existing

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 8100 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 24 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 65.62

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	80.6	167.4	357.7

TABLE Existing-04
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 10/23/2013
ROADWAY SEGMENT: Lake Forest Dr. north of Rancho Pkwy
NOTES: Baker Ranch - Existing

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 16000 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 24 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 68.57

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL	70 CNEL	65 CNEL	60 CNEL	55 CNEL
	61.1	123.4	261.9	562.3

TABLE Existing-05
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 10/23/2013
ROADWAY SEGMENT: Lake Forest Dr. south of Rancho Pkwy
NOTES: Baker Ranch - Existing

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 18500 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 24 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 69.20

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
66.4	135.5	288.3	619.3

TABLE Existing-06
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 10/23/2013
ROADWAY SEGMENT: Portola Pkwy north of Rancho Pkwy
NOTES: Baker Ranch - Existing

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 23900 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 24 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 70.31

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL	70 CNEL	65 CNEL	60 CNEL	55 CNEL
	77.3	160.0	341.6	734.4

TABLE Existing-07
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 10/23/2013
ROADWAY SEGMENT: Portola Pkwy south of Rancho Pkwy
NOTES: Baker Ranch - Existing

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 30600 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 24 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 71.39

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
89.9	188.1	402.5	865.8

TABLE Existing-08
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 10/23/2013
ROADWAY SEGMENT: SR-241 Tollroad
NOTES: Baker Ranch - Existing

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 39900 SPEED (MPH): 70 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.12	12.51	9.29
M-TRUCKS	2.10	0.12	0.26
H-TRUCKS	0.52	0.02	0.06

ACTIVE HALF-WIDTH (FT): 36 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 75.67

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
189.9	403.2	865.7	1863.5

TABLE Existing with Project-01
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 10/23/2013
ROADWAY SEGMENT: Rancho Parkway west of Lake Forest Dr.
NOTES: Baker Ranch - Existing with Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 8300 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 24 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 65.72

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	81.8	170.1	363.5

TABLE Existing with Project-02
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 10/23/2013
ROADWAY SEGMENT: Rancho Parkway between Lake Forest Dr. and Sports Park
NOTES: Baker Ranch - Existing with Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 9600 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 24 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 66.35

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	89.4	187.1	400.4

TABLE Existing with Project-03
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 10/23/2013
ROADWAY SEGMENT: Rancho Parkway between Sports Park and Portola Pkwy.
NOTES: Baker Ranch - Existing with Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 8700 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 24 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 65.93

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	84.2	175.4	375.1

TABLE Existing with Project-04
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 10/23/2013
ROADWAY SEGMENT: Lake Forest Dr. north of Rancho Pkwy
NOTES: Baker Ranch - Existing with Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 16300 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 24 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 68.65

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
61.8	124.9	265.1	569.2

TABLE Existing with Project-05
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 10/23/2013
ROADWAY SEGMENT: Lake Forest Dr. south of Rancho Pkwy
NOTES: Baker Ranch - Existing with Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 18900 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 24 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 69.30

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL	70 CNEL	65 CNEL	60 CNEL	55 CNEL
	67.2	137.4	292.4	628.2

TABLE Existing with Project-06
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 10/23/2013
ROADWAY SEGMENT: Portola Pkwy north of Rancho Pkwy
NOTES: Baker Ranch - Existing with Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 24200 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 24 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 70.37

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
77.9	161.3	344.5	740.6

TABLE Existing with Project-07
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 10/23/2013
ROADWAY SEGMENT: Portola Pkwy south of Rancho Pkwy
NOTES: Baker Ranch - Existing with Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 31000 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 24 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 71.44

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
90.6	189.7	406.0	873.4

TABLE Existing with Project-08
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 10/23/2013
ROADWAY SEGMENT: SR-241 Tollroad
NOTES: Baker Ranch - Existing with Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 39900 SPEED (MPH): 70 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.12	12.51	9.29
M-TRUCKS	2.10	0.12	0.26
H-TRUCKS	0.52	0.02	0.06

ACTIVE HALF-WIDTH (FT): 36 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 75.67

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
189.9	403.2	865.7	1863.5

TABLE 2015 Cumulative w/o Project-01
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 10/23/2013
ROADWAY SEGMENT: Rancho Parkway west of Lake Forest Dr.
NOTES: Baker Ranch - 2015 Cumulative w/o Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 12000 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 24 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 67.32

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	102.8	216.7	464.4

TABLE 2015 Cumulative w/o Project-02
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 10/23/2013
ROADWAY SEGMENT: Rancho Parkway between Lake Forest Dr. and Sports Park
NOTES: Baker Ranch - 2015 Cumulative w/o Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 12000 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 24 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 67.32

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	102.8	216.7	464.4

TABLE 2015 Cumulative w/o Project-03
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 10/23/2013
ROADWAY SEGMENT: Rancho Parkway between Sports Park and Portola Pkwy.
NOTES: Baker Ranch - 2015 Cumulative w/o Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 12000 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 24 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 67.32

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	102.8	216.7	464.4

TABLE 2015 Cumulative w/o Project-04
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 10/23/2013
ROADWAY SEGMENT: Lake Forest Dr. north of Rancho Pkwy
NOTES: Baker Ranch - 2015 Cumulative w/o Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 22700 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 24 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 70.09

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
74.9	154.7	330.1	709.7

TABLE 2015 Cumulative w/o Project-05
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 10/23/2013
ROADWAY SEGMENT: Lake Forest Dr. south of Rancho Pkwy
NOTES: Baker Ranch - 2015 Cumulative w/o Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 29900 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 24 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 71.29

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
88.6	185.2	396.4	852.6

TABLE 2015 Cumulative w/o Project-06
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 10/23/2013
ROADWAY SEGMENT: Portola Pkwy north of Rancho Pkwy
NOTES: Baker Ranch - 2015 Cumulative w/o Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 31400 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 24 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 71.50

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
91.3	191.3	409.5	880.8

TABLE 2015 Cumulative w/o Project-07
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 10/23/2013
ROADWAY SEGMENT: Portola Pkwy south of Rancho Pkwy
NOTES: Baker Ranch - 2015 Cumulative w/o Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 42600 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 24 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 72.82

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
110.6	233.8	501.5	1079.3

TABLE 2015 Cumulative w/o Project-08
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 10/23/2013
ROADWAY SEGMENT: SR-241 Tollroad
NOTES: Baker Ranch - 2015 Cumulative w/o Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 53800 SPEED (MPH): 70 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.12	12.51	9.29
M-TRUCKS	2.10	0.12	0.26
H-TRUCKS	0.52	0.02	0.06

ACTIVE HALF-WIDTH (FT): 36 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 76.97

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
230.4	491.4	1056.3	2274.2

TABLE 2015 Cumulative with Project-01
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 10/23/2013
ROADWAY SEGMENT: Rancho Parkway west of Lake Forest Dr.
NOTES: Baker Ranch - 2015 Cumulative with Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 12000 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 24 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 67.32

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL	70 CNEL	65 CNEL	60 CNEL	55 CNEL
	0.0	102.8	216.7	464.4

TABLE 2015 Cumulative with Project-02
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 10/23/2013
ROADWAY SEGMENT: Rancho Parkway between Lake Forest Dr. and Sports Park
NOTES: Baker Ranch - 2015 Cumulative with Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 12700 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 24 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 67.57

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	106.6	224.9	482.3

TABLE 2015 Cumulative with Project-03
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 10/23/2013
ROADWAY SEGMENT: Rancho Parkway between Sports Park and Portola Pkwy.
NOTES: Baker Ranch - 2015 Cumulative with Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 12600 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 24 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 67.53

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	106.0	223.7	479.7

TABLE 2015 Cumulative with Project-04
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 10/23/2013
ROADWAY SEGMENT: Lake Forest Dr. north of Rancho Pkwy
NOTES: Baker Ranch - 2015 Cumulative with Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 23000 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 24 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 70.15

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
75.5	156.1	333.0	715.9

TABLE 2015 Cumulative with Project-05
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 10/23/2013
ROADWAY SEGMENT: Lake Forest Dr. south of Rancho Pkwy
NOTES: Baker Ranch - 2015 Cumulative with Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 30300 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 24 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 71.35

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
89.3	186.9	399.9	860.2

TABLE 2015 Cumulative with Project-06
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 10/23/2013
ROADWAY SEGMENT: Portola Pkwy north of Rancho Pkwy
NOTES: Baker Ranch - 2015 Cumulative with Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 32300 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 24 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 71.62

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
92.9	194.9	417.2	897.6

TABLE 2015 Cumulative with Project-07
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 10/23/2013
ROADWAY SEGMENT: Portola Pkwy south of Rancho Pkwy
NOTES: Baker Ranch - 2015 Cumulative with Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 43300 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 24 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 72.90

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
111.8	236.3	507.0	1091.1

TABLE 2015 Cumulative with Project-08
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 10/23/2013
ROADWAY SEGMENT: SR-241 Tollroad
NOTES: Baker Ranch - 2015 Cumulative with Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 53800 SPEED (MPH): 70 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.12	12.51	9.29
M-TRUCKS	2.10	0.12	0.26
H-TRUCKS	0.52	0.02	0.06

ACTIVE HALF-WIDTH (FT): 36 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 76.97

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
230.4	491.4	1056.3	2274.2

TABLE 2030 Cumulative without Project-01
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 10/23/2013
ROADWAY SEGMENT: Rancho Parkway west of Lake Forest Dr.
NOTES: Baker Ranch - 2030 Cumulative without Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 20000 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 24 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 69.54

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
69.5	142.5	303.6	652.3

TABLE 2030 Cumulative without Project-02
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 10/23/2013
ROADWAY SEGMENT: Rancho Parkway between Lake Forest Dr. and Sports Park
NOTES: Baker Ranch - 2030 Cumulative without Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 27000 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 24 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 70.84

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
83.2	173.3	370.4	796.6

TABLE 2030 Cumulative without Project-03
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 10/23/2013
ROADWAY SEGMENT: Rancho Parkway between Sports Park and Portola Pkwy.
NOTES: Baker Ranch - 2030 Cumulative without Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 27000 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 24 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 70.84

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
83.2	173.3	370.4	796.6

TABLE 2030 Cumulative without Project-04
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 10/23/2013
ROADWAY SEGMENT: Lake Forest Dr. north of Rancho Pkwy
NOTES: Baker Ranch - 2030 Cumulative without Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 27600 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 24 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 70.94

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
84.3	175.8	375.9	808.3

TABLE 2030 Cumulative without Project-05
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 10/23/2013
ROADWAY SEGMENT: Lake Forest Dr. south of Rancho Pkwy
NOTES: Baker Ranch - 2030 Cumulative without Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 36800 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 24 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 72.19

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
100.8	212.3	455.0	979.1

TABLE 2030 Cumulative without Project-06
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 10/23/2013
ROADWAY SEGMENT: Portola Pkwy north of Rancho Pkwy
NOTES: Baker Ranch - 2030 Cumulative without Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 33900 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 24 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 71.83

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
95.8	201.2	430.9	927.0

TABLE 2030 Cumulative without Project-07
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 10/23/2013
ROADWAY SEGMENT: Portola Pkwy south of Rancho Pkwy
NOTES: Baker Ranch - 2030 Cumulative without Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 51500 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 24 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 73.65

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
124.9	265.0	569.0	1224.8

TABLE 2030 Cumulative without Project-08
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 10/23/2013
ROADWAY SEGMENT: SR-241 Tollroad
NOTES: Baker Ranch - 2030 Cumulative without Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 121100 SPEED (MPH): 70 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
AUTOS	75.12	12.51	9.29
M-TRUCKS	2.10	0.12	0.26
H-TRUCKS	0.52	0.02	0.06

ACTIVE HALF-WIDTH (FT): 36 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 80.49

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
392.4	842.5	1813.5	3905.7

TABLE 2030 Cumulative with Project-01
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 10/23/2013
ROADWAY SEGMENT: Rancho Parkway west of Lake Forest Dr.
NOTES: Baker Ranch - 2030 Cumulative with Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 19400 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 24 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 69.41

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
68.3	139.7	297.5	639.2

TABLE 2030 Cumulative with Project-02
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 10/23/2013
ROADWAY SEGMENT: Rancho Parkway between Lake Forest Dr. and Sports Park
NOTES: Baker Ranch - 2030 Cumulative with Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 20300 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 24 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 69.61

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
70.1	143.9	306.6	658.8

TABLE 2030 Cumulative with Project-03
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 10/23/2013
ROADWAY SEGMENT: Rancho Parkway between Sports Park and Portola Pkwy.
NOTES: Baker Ranch - 2030 Cumulative with Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 21500 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 24 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 69.86

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
72.5	149.4	318.5	684.5

TABLE 2030 Cumulative with Project-04
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 10/23/2013
ROADWAY SEGMENT: Lake Forest Dr. north of Rancho Pkwy
NOTES: Baker Ranch - 2030 Cumulative with Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 25600 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 24 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 70.61

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
80.5	167.4	357.6	768.8

TABLE 2030 Cumulative with Project-05
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 10/23/2013
ROADWAY SEGMENT: Lake Forest Dr. south of Rancho Pkwy
NOTES: Baker Ranch - 2030 Cumulative with Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 33800 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 24 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 71.82

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
95.6	200.8	430.0	925.1

TABLE 2030 Cumulative with Project-06
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 10/23/2013
ROADWAY SEGMENT: Portola Pkwy north of Rancho Pkwy
NOTES: Baker Ranch - 2030 Cumulative with Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 32900 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 24 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 71.70

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
94.0	197.2	422.4	908.7

TABLE 2030 Cumulative with Project-07
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 10/23/2013
ROADWAY SEGMENT: Portola Pkwy south of Rancho Pkwy
NOTES: Baker Ranch - 2030 Cumulative with Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 48600 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 24 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 73.40

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
120.3	255.1	547.5	1178.4

TABLE 2030 Cumulative with Project-08
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 10/23/2013
ROADWAY SEGMENT: SR-241 Tollroad
NOTES: Baker Ranch - 2030 Cumulative with Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 121100 SPEED (MPH): 70 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.12	12.51	9.29
M-TRUCKS	2.10	0.12	0.26
H-TRUCKS	0.52	0.02	0.06

ACTIVE HALF-WIDTH (FT): 36 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 80.49

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
392.4	842.5	1813.5	3905.7
